WATER TEMPERATURE PREDICTIONS WITH HEC5Q
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1. A series of HEC5Q model runs was made to assess the relative impacts of Dworshak releases on water temperature in the forebay of Lower Granite, Little Goose, Lower Monumental and Ice Harbor. We emphasize the word "Relative". This is not meant to be an absolute prediction, which would require that we first exactly replicate the observed 1999 water temperatures at the Lower Snake River reservoirs before making assumptions on weather conditions for the remainder of the run (August 8 through September 30, 1999). The needed weather data for that type of runs are only available up to April 1999.

2. The following assumptions were made:

2a. Flow data: 1999 data as shown on the Corps' Weekly Flow Projection spreadsheets. DWR releases are as suggested by NMFS (scenarios 1 through 6) and CRITFC (scenario 7) are as tabulated below. The resulting DWR pool elevations are also shown below for comparison purposes.

| *Week ending* | *Scenario* | *Scenario* | *Scenario* | *Scenario* | *Scenario* | *Scenario (plus BRN 6 kcfs)* | *Scenario (CRITFC)* |
|---|---|---|---|---|---|---|---|
| 08-Aug | 19 | 19 | 19 | 19 | 19 | 19 | 6 |
| 15-Aug | 19 | 12.5 | 15 | 15 | 15 | 15 | 6 |
| 22-Aug | 14 | 12 | 12.5 | 12.5 | 12.5 | 12.5 | 6 |
| 29-Aug | 12.4 | 10 | 12.5 | 8 | 8 | 8 | 6 |
| 05-Sep | 1.5 | 8.5 | 5.4 | 6 | 6 | 6 | 6 |
| 12-Sep | 1.5 | 5.5 | 1.5 | 4 | 4 | 4 | 6 |
| 19 Sep | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 6 |
| 26 Sep | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 6 |
| *DWR El. on 8/31* | *1522.6* | *1532.2* | *1527.3* | *1531.6* | *1520.5* | *1520.5* | *1546.3* |
| *DWR El. on 9/30* | *1522.3* | *1522.1* | *1523.7* | *1525.1* | *1517.2* | *1516.8* | *1538.6* |

2b. Initial water temperature profiles at DWR and BRN: July 1999 data for DWR; assumed profile for BRN

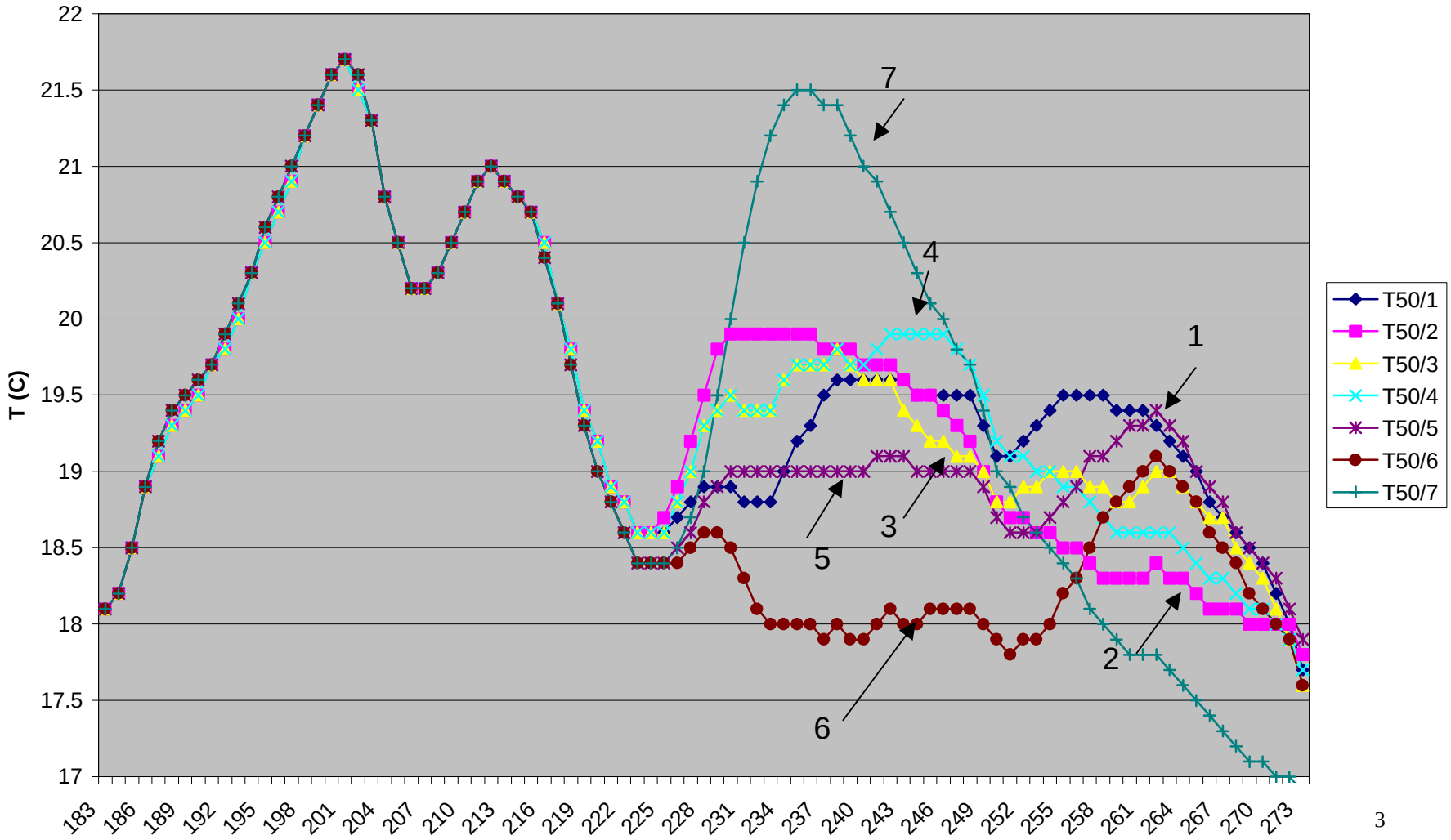
2c. Weather: 1984 conditions (below average; closely reflect July 1 - August 8, 1999 water temperatures in the forebay of LWG and IHR); 1985 conditions (average).

The results with 1984 and 1985 weather conditions are illustrated below based on model results for LWG and IHR for the July 1 - September 30 period. So far, it appears that 1999 weather data are closest to 1984 data at both locations.

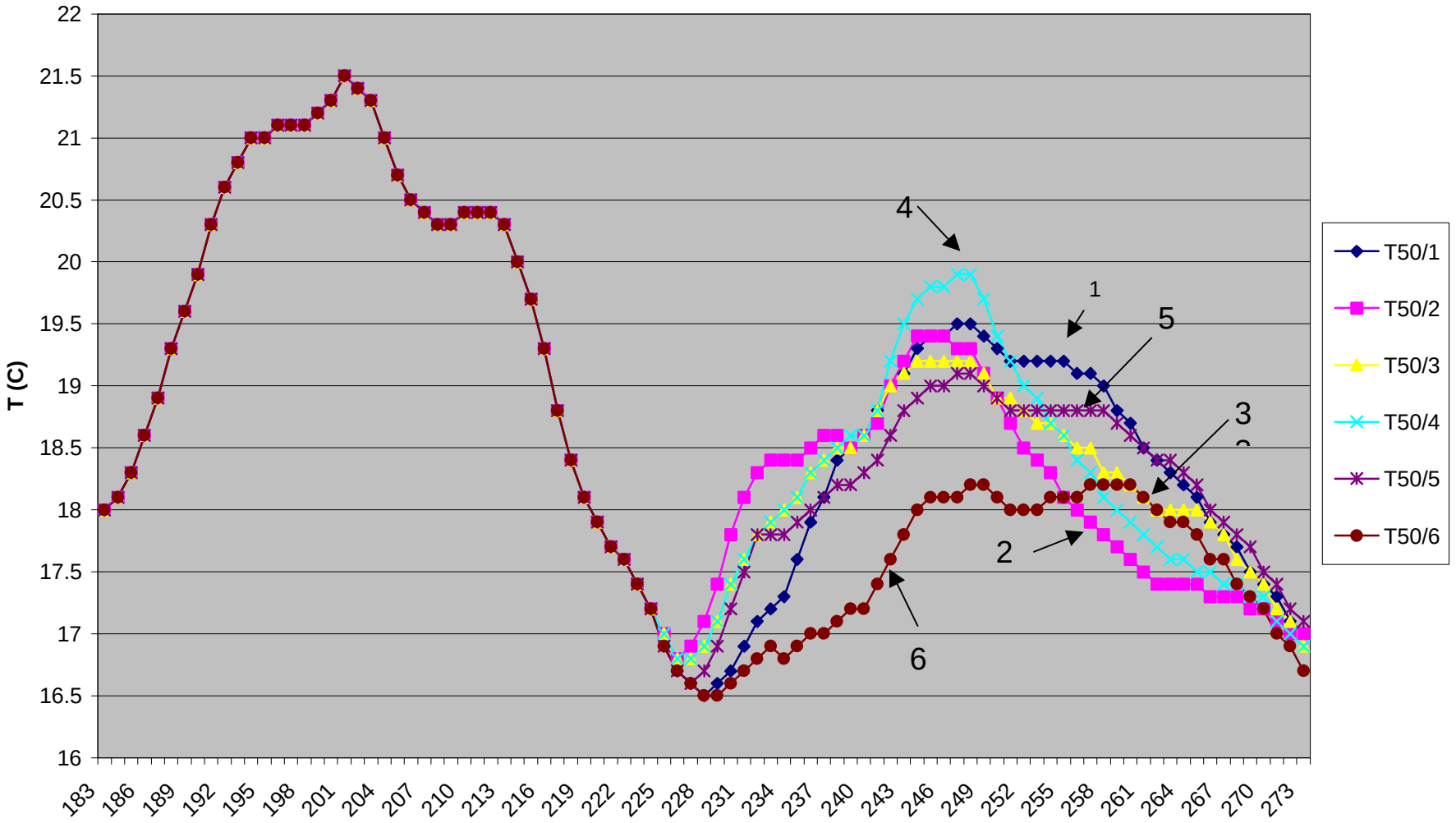
3. The HEC5Q model in its current form treats the Lower Snake River reservoirs as longitudinally segmented river reaches with mean temperature at each location (no distinction between bottom and surface temperature). Another version of that model is available that can be used to predict stratification. For this quick comparative analysis, using assumed weather and flow scenarios, use of that more detailed simulation version was not deemed necessary.

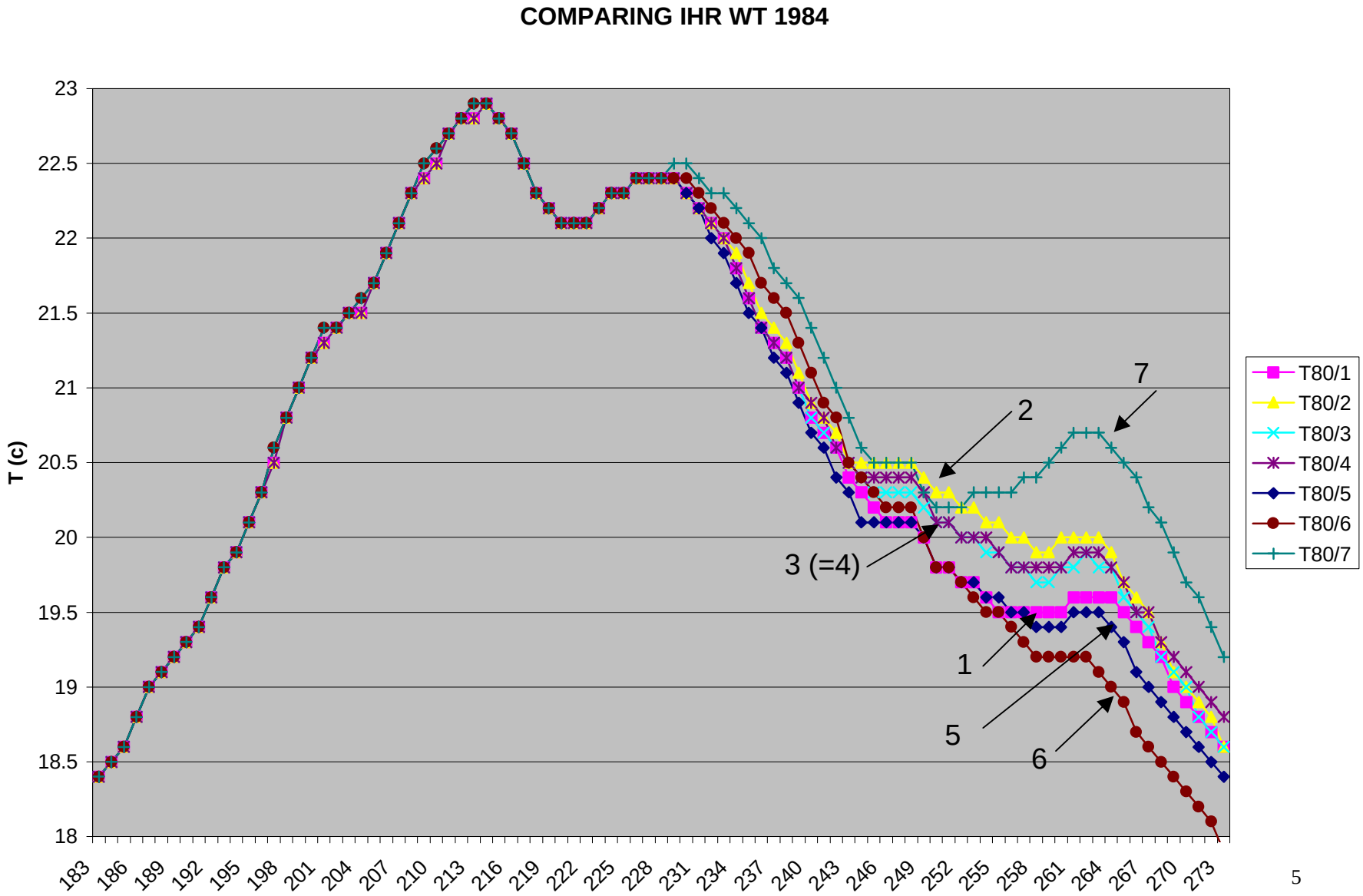
4. Model results presented in this document show water temperature trends in response to cool water releases from upstream storage (mainly Dworshak) and weather conditions. As stated in the introduction, these results are not meant to provide absolute temperature values. Decision on the best release scenario should be made based on this as well as other relevant information.

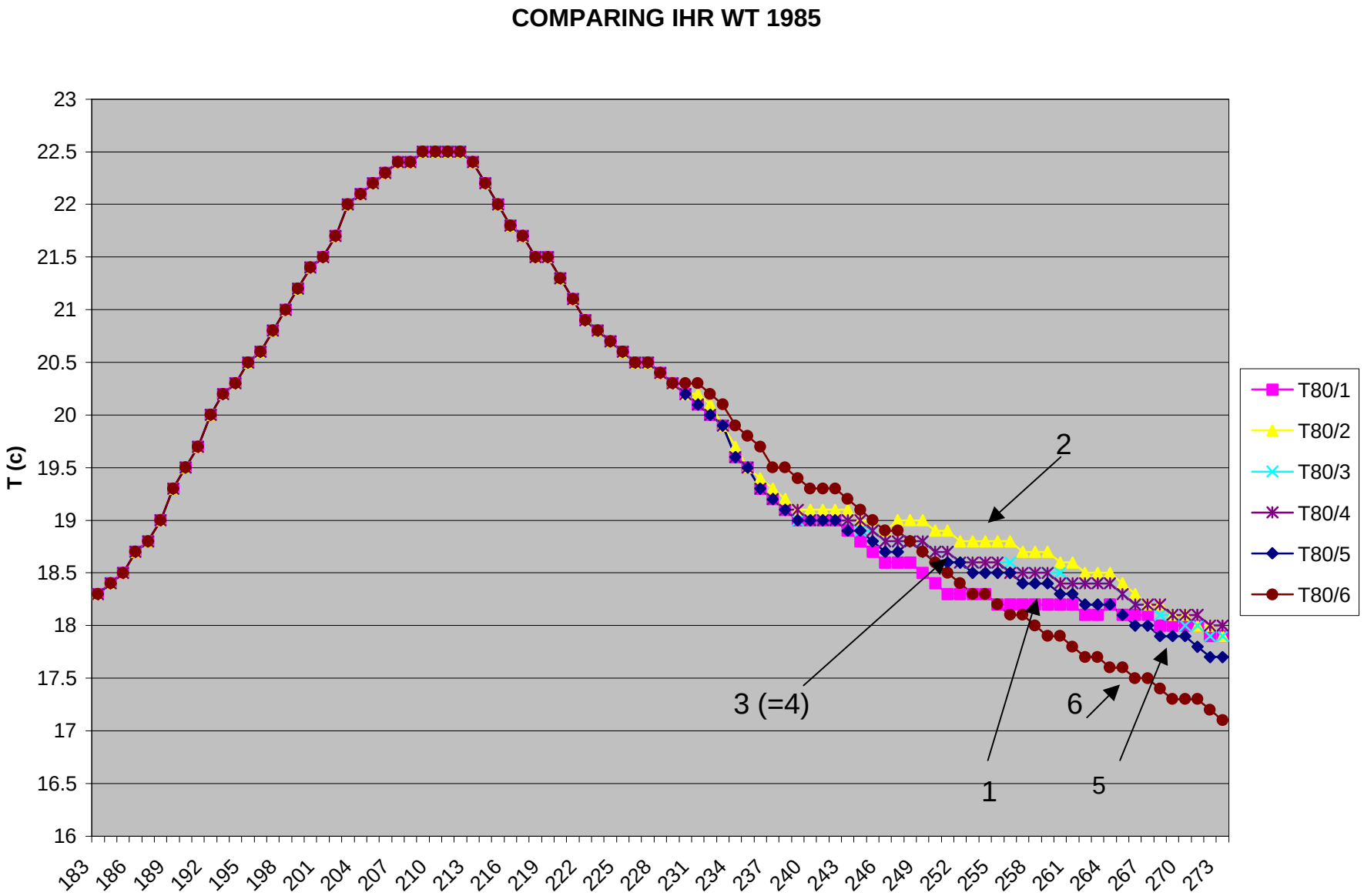
## COMPARING WT AT LWG FOREBAY (1984)



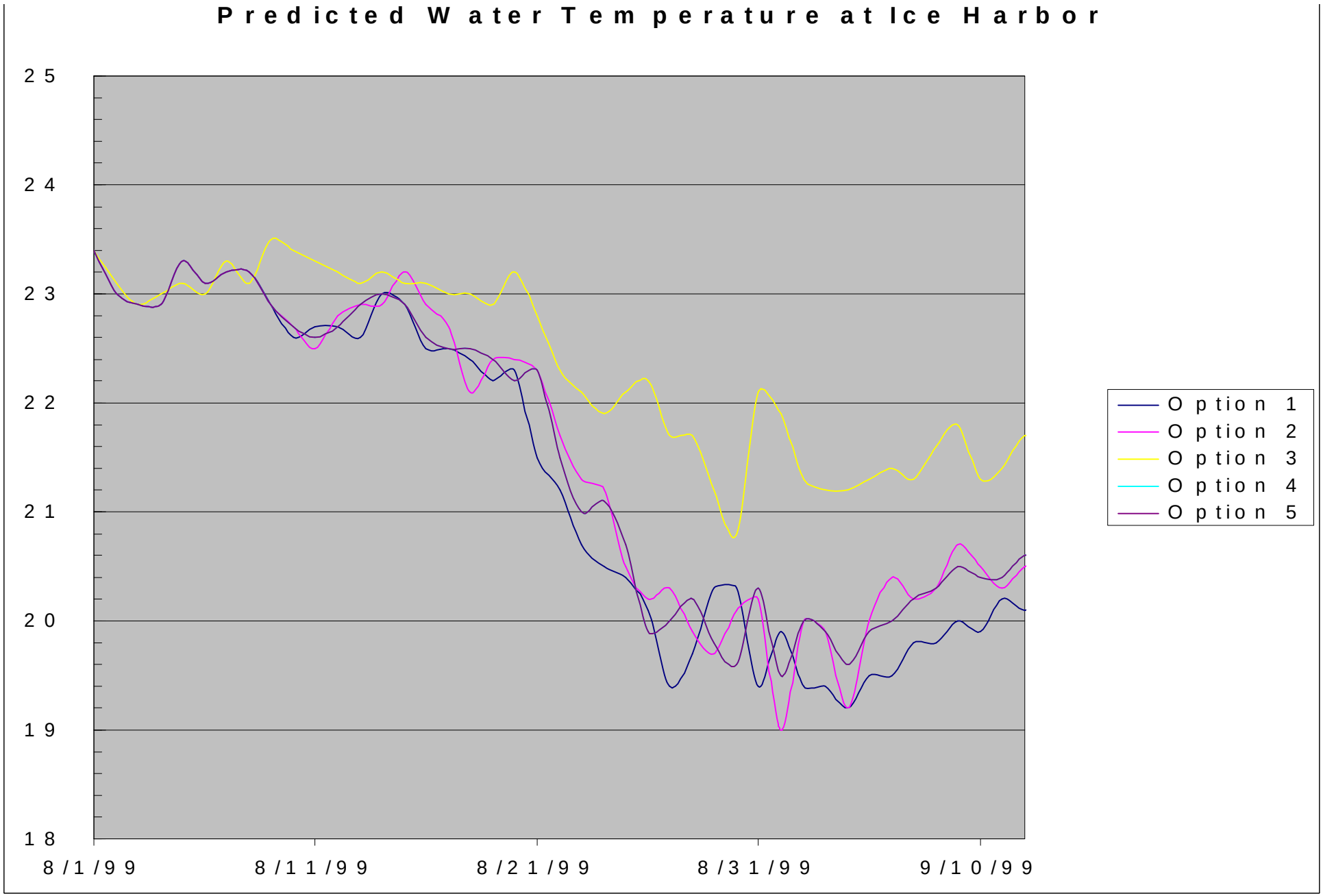
## COMPARING WT AT LWG FOREBAY (1985)




COMPARING IHR WT 1984
T (c)
23
22.5
22
21.5
21
20.5
20
19.5
19
18.5
18
183
186
189
192
195
198
201
204
207
210
213
216
219
222
225
228
231
234
237
240
243
246
249
252
255
258
261
264
267
270
273
T80/1
T80/2
T80/3
T80/4
T80/5
T80/6
T80/7
7
2
3 (=4)
1
5
6


COMPARING IHR WT 1985
T (c)
23
22.5
22
21.5
21
20.5
20
19.5
19
18.5
18
17.5
17
16.5
16
183
186
189
192
195
198
201
204
207
210
213
216
219
222
225
228
231
234
237
240
243
246
249
252
255
258
261
264
267
270
273
T80/1
T80/2
T80/3
T80/4
T80/5
T80/6
1
2
3 (=4)
5
6

The results produced by the EPA model (provided courtesy John Yearsley) are also shown for comparison purposes. The EPA modeler concluded that scenario (Option) 7 (proposed by CRITFC) has the least desirable impact on temperature. It appears to be best to release a large amount of water now rather than release a small amount over a longer period, at least for temperature.


Predicted Water Temperature at Ice Harbor
25
24
23
22
21
20
19
18
8/1/99
8/11/99
8/21/99
8/31/99
9/10/99
Option 1
Option 2
Option 3
Option 4
Option 5